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Buchbesprechungen

BARON, G.; STEPHAN, H.; FRAHM, H. D.: **Comparative Neurobiology in Chiroptera.** 3 vols. Basel, Boston, Berlin: Birkhäuser Verlag 1996. 1596 pp. DM 358,–. ISBN 3-7643-5394-5

In this three volume set the well-known brain researchers G. BARON (Montreal), H. STEPHAN (Frankfurt), and H. D. FRAHM (Düsseldorf) present a compilation on brain configuration, anatomy, size, and quantitative composition within the order Chiroptera from own data and results from the literature. This is a continuation of previously published comparative compilations on brains of Insectivora and Primates. Of the 925 chiropteran species described worldwide to date, 336 were treated here and 260 species of 149 genera were investigated in more detail and are documented in quantitative brain proportioning. Except for the families Myzopodidae (known in one species from Madagaskar) and Mystacinidae (one species distributed in New Zealand extant) all the other of the 18 families are represented by several or at least one species. Thus, an extremely large amount of species serves as a basis for a biological interpretation of brain size and composition, having resulted during evolutionary and adaptive radiation in this order.

The first volume mainly presents most of the raw data on macromorphology and brain composition in figures and tables. A short introduction is followed by a very detailed chapter on material and methods. Herein comments are made on the use of material from own collection and data from the literature, on several measurements, brain sectioning, determination of fresh-tissue volumes, calculations of species-specific standards, and on methods for comparison of brain size and volumes of structures. The most valuable effect of interspecific comparison lies in the consequent and critical utilization of the evaluating approach by means of the allometrical method on the basis of body size. Thus, as the authors performed earlier for the other orders, here also sizes of total brain as well as brains parts of Chiroptera are compared to those of the most primitive extant Insectivora, namely, the Tenrecinae. This resulted in body size-independent average encephalization or size indices for the species, genera, subfamilies, and families dealt with. The methodological comments are followed by a list of species sampled over four decades and used for brain sectioning in the laboratory of H. STEPHAN and another list of abbreviations for taxonomic units as well as for brain structures and other items used in all three volumes. Comparative brain characteristics are then described starting with macromorphology. These descriptions are visualized by very impressive outline drawings of brains from 16 representative species of Chiroptera in dorsal, lateral, and ventral views and by mediosagittal reconstructions of brains from 6 species. These figures give a general overview on the large diversity of brain shape and appearance within the order. The following two main chapters are devoted to comparisons. Encephalization indices and indices for brain parts are given and scaled for taxonomic groups as was usually performed by these authors in the past. Concerning total brain size, the Megachiroptera group (55 species) has reached higher encephalization indices between 226 (*Hypsignathus monstrosus*) and 404 (*Pteropus edwarsi*). Thus, they have brains about 2 to 4 times larger than Tenrecinae of comparable body size would have. The Microchiroptera (281 species) have lower indices from 83 (*Tylonycteris* spp.) to 312 (*Vampyros vittatus*). Bamboo bats thus have the smallest brains, even below the level of Tenrecinae. Telencephalon and diencephalon are distinctly larger in the Megachiroptera, whereas the indices for mesencephalon, cerebellum and medulla oblongata are about the same in both groups within a certain species-specific variation. In the following chapter 53 tables are given over 168 pages with original data on linear measurements, volumes, etc. and with calculated relative values resulting from these. The last chapter presents two atlases of several consecutive brain slices cut in the frontal plane together with corresponding drawings on opposite pages with markings of brain parts, regions, structures, nuclei, fibers and their delineations and boundaries. These are from a brain of *Rousettus amplexicaudatus* and *Myotis montivagus*.

The second volume contains two chapters of which one is focussed on brain characteristics in taxonomic units following the classification of CORBET and HILL (1980). This is a very critical, concise, and careful integration of what was published on general biology, brain, and sense organs of Chiroptera in the past. The other chapter concerned with size index profiles in taxonomic units discusses own results in more detail.

The third volume is concerned with the very diverse life styles of the Chiroptera. Brain characteristics are presented in connection with functional systems, ecoethological adaptations, adaptive radiation, and evolution. Thus, in one chapter physiological, histological, ethological and other results are discussed in connection with prominent brain structures of the olfactory, visual, somatosensory, auditory, vestibular, motor, and limbic system as well as with the neocortex in toto and with the primary areas. Another chapter is concerned with reflections on convergent major niche adaptations and especially discusses brain peculiarities of insect eaters, trawlers, gleaners, blood eaters, flower and nectar eaters, and fruit eaters. Finally the two last chapters are devoted to brain characteristics under the light of adaptive radiation and evolution and in connection with the monophyly-diphyly controversy of Mega- and Microchiroptera. Also here abundant information concerned with palaeontological data, comparative anatomy and other sources is debated, implying an independent and convergent evolution of flight, echolocation, and brain size in this order. References are listed on 169 pages at the end of the treatise and a subject index covering 26 pages.

The volumes are a unique and comprehensive compilation on brains of a special mammalian group and are valuable alone for the data sake as a source, but beyond this, the volumes are a highly valuable contribution especially with reference to their biological relevance.

D. Kruska, Kiel

Volf, J. (1996): **Das Urwildpferd, *Equus przewalskii.*** 4. überarbeitete Aufl. Die neue Brehm-Bücherei, Bd. 249. Magdeburg: Westarp Wissenschaften. 147 S., 89 Abb., 7 Tab. DM 39,90. ISBN 3-89432-471-6.

Wenn ein Buch in vierter Auflage erscheinen kann, wird deutlich, daß eine interessierte Leserschaft verfügbar ist. Es ist zu hoffen, daß dieses Interesse nicht nur ein Teil der „Pferdemode" ist, die überall auf der Welt zu beobachten ist, sondern hervorgerufen wird durch die Tatsache, daß ein in freier Wildbahn vermutlich ausgerottetes eindrucksvolles Säugetier in den letzten vierzig Jahren unter Obhut des Menschen eine mehr als vierzigfache Zunahme des Gesamtbestandes auf rund 1 400 Tiere (1994) erfuhr.

J. Volf, 30 Jahre lang der Herausgeber des Internationalen Zuchtbuches für Przewalskipferde, schildert zunächst die Entdeckungsgeschichte des Urwildpferdes und erörtert seine Systematik und Nomenklatur. Die Erscheinungsform eiszeitlicher und heutiger Wildpferde werden dokumentiert, ferner werden Lebensweise und Verhalten in menschlicher Obhut geschildert. In einem eigenen Kapitel wir die Fortpflanzungsbiologie von *Equus przewalskii* behandelt. Aus eigener Erfahrung gibt J. Volf einen Einblick in die Organisation, sowie in die Führung und Verwaltung des Internationalen Zuchtbuchs für das Przewalskipferd. Dabei macht er besonders auf neue, Anfang der neunziger Jahres aufgetauchte Probleme aufmerksam: Dank der Zunahme der Individuenzahl können große Herden mit mehreren zeugungsfähigen Hengsten in großen Freiausläufen gehalten werden. Unter diesen Umständen können die Fohlen nicht mehr zweifelsfrei ihren Eltern zugeordnet werden. Der heutige Leiter des Zuchtbuches, E. Kûs, schildert weitere Probleme, wie sie sich aus der eigentlich höchst erfreulichen Bestandszunahme der Wildpferde ergeben: Inzuchteffekte aufgrund der langjährigen Gefangenschaftshaltung treten auf. Ferner bereitet die Ausbürgerung im ursprünglichen Verbreitungsgebiet in der Mongolei und in China finanzielle und organisatorische Probleme. Kompetenzrangeleien und die Anwesenheit von Hauspferden in den Auswilderungsgebieten von Przewalskipferden gefährden eine erfolgreiche Wiedereinbürgerung. Die Aridisierung weiter Gebiete im Südwesten der Mongolei, welche als wesentlicher Faktor für das Aussterben der Przewalskipferde in der freien Natur verantwortlich war, schreitet fort. Ein bis zum Jahre 1996 reichendes dreieinhalbseitiges Literaturverzeichnis und ein Stichwortregister schließen den vorliegenden Band ab.

P. Langer, Gießen